

Application No.: 10/795,952

Docket No.: TOW-066RCE

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A fuel cell comprising:

a porous insulating film;

a plurality of power generation units positioned on top of the porous insulating film, the plurality of power generation units including a pair of adjacent power generation units, said power generation units each including a first electrode facing said porous insulating film, a second electrode, and an electrolyte interposed between said first electrode and said second electrode;

a first electrically conductive film that is disposed between said pair of adjacent power generation units and is not stacked on either of said adjacent power generation units, said first electrically conductive film being electrically connected to said first electrode of one of said adjacent power generation units, and extending in parallel to said first electrode; and

a second electrically conductive film that is disposed between said pair of adjacent power generation units and is not stacked on either of said adjacent power generation units, said second electrically conductive film being electrically connected to said second electrode of the other of said adjacent power generation units, and extending in parallel to said second electrode,

wherein said first electrically conductive film or said second electrically conductive film has an expansion between said adjacent power generation units for connecting said first electrically conductive film and said second electrically conductive film, and

wherein a portion of each electrolyte of the pair of adjacent power generation units is sandwiched between the first and second electrically conductive films.

2. (Original) A fuel cell according to claim 1, wherein said first electrically conductive film is arranged in a substantially same plane with a gas diffusion layer of said first electrode, and said second electrically conductive film is arranged in a substantially same plane with a gas diffusion layer of said second electrode.

3. (Previously Presented) A fuel cell according to claim 1, wherein said first electrically conductive film is made of metal, and said second electrically conductive film is made of a composite material including a resin and an electrically conductive material.

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4. (Previously Presented) A fuel cell according to claim 1, wherein said first electrically conductive film is made of a composite material including a resin and an electrically conductive material, and said second electrically conductive film is made of metal.

5. (Previously Presented) A fuel cell according to claim 1, wherein a film having windows is laminated on said porous insulating film such that at least one of said first and second electrodes of said power generation units are disposed in said windows.

6. (Original) A fuel cell according to claim 1, wherein a reactant gas supply passage and a reactant gas discharge passage extend through an end of said fuel cell.

7. (Currently Amended) A fuel cell, comprising:

a plurality of power generation units each including first and second electrodes and an electrolyte interposed between said first and second electrodes, said first electrode including a first electrically conductive gas diffusion layer and a first catalyst layer stacked together, wherein a first end of said first electrically conductive gas diffusion layer extends beyond a first end of said first catalyst layer, said second electrode including a second electrically conductive gas diffusion layer and a second catalyst layer stacked together, wherein a second end of said second electrically conductive gas diffusion layer extends beyond a second end of said second catalyst layer, said power generation units including a first power generation unit and a second power generation unit adjacent to said first power generation unit,

~~wherein a first end of said first electrically conductive gas diffusion layer extends beyond a first end of said first catalyst layer and wherein a second end of said second electrically conductive gas diffusion layer extends beyond a second end of said second catalyst layer;~~

wherein the first end of said first electrically conductive gas diffusion layer of said first electrode of said first power generation unit protrudes toward said second power generation unit;

said ~~the~~ second end of second electrically conductive gas diffusion layer of said second electrode of said second power generation unit protrudes toward said first power generation unit;

and

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a first reinforcing film that is in physical contact with and interposed between said electrolyte and said first end of said first electrically conductive gas diffusion layer of said first electrode, wherein said first reinforcing film is separate from said first catalyst layer; and
a second reinforcing film that is in physical contact with and interposed between said electrolyte and said second end of said second electrically conductive gas diffusion layer of said second electrode, wherein said second reinforcing film is separate from said second catalyst layer.
wherein said first end and said second end are electrically connected with each other by an electrically conductive member extending through at least said electrolyte.

8. (Previously Presented) A fuel cell according to claim 7, wherein said first end of said first electrically conductive gas diffusion layer of said first electrode of said first power generation unit and said second end of said second electrically conductive gas diffusion layer of said second electrode of said second power generation unit have overlapping portions, and at least said electrolyte is interposed between said overlapping portions;

said overlapping portions are connected together by said electrically conductive member; and

said electrically conductive member is an electrically conductive rivet member.

9. (Original) A fuel cell according to claim 7,
wherein said electrolyte is an electrolyte membrane;
said power generation units are arranged in a same plane to form an MEA unit; and
said fuel cell further comprises first and second electrically insulating separators for sandwiching said MEA unit;

a fuel gas flow field facing said power generation units is provided on said first electrically insulating separator; and

an oxygen-containing gas flow field facing said power generation units is provided on said second electrically insulating separator.

10. (Withdrawn) A method of producing a fuel cell including a plurality of power generation units arranged in a same plane, said power generation units each including first and second electrodes, and an electrolyte interposed between said first and second electrodes, said

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power generation units including a first power generation unit and a second power generation unit adjacent to said first power generation unit, said method comprising the steps of:

attaching a first electrically conductive film on a porous electrically conductive film;
providing said first electrode of said first power generation unit and said first electrode of said second power generation unit;

electrically connecting said first electrode of said second power generation unit and said first electrically conductive film;

providing a first electrolyte on said first electrode of said first power generation unit and providing a second electrolyte on said first electrode of said second power generation unit such that said first and second electrolytes are partially overlapped on said first electrically conductive film;

providing said second electrode of said first power generation unit and said second electrode of said second power generation unit on said first and second electrolytes, respectively;

electrically connecting said second electrode of said first power generation unit and said first electrically conductive film through said second electrically conductive film; and

providing a resin insulator on said second electrically conductive film, and in a gap between said second electrically conductive film and said second electrode.

11. (Withdrawn) A method according to claim 10, further comprising the steps of:

electrically connecting a gas diffusion layer of said first electrode of said second power generation unit and said first electrically conductive film; and

electrically connecting a gas diffusion layer of said second electrode of said first power generation unit and said second electrically conductive film for electrically connecting said second electrode of said first power generation unit and said first electrode of said second power generation unit.

12. (Currently Amended) A fuel cell stack comprising:

_____ a plurality of fuel cells, said fuel cells each including a plurality of power generation units arranged in a same plane and a pair of electrically insulating separators for sandwiching said power generation units, said power generation units each including a first electrode a second electrode and an electrolyte interposed between said first electrode and said second electrode,
~~said fuel cell stack further comprising:~~

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a casing containing said fuel cells,

wherein a plurality of guide grooves are formed on at least one of said separators on a surface opposite to a surface facing said power generation units, for supplying a coolant along said separator;

a coolant passage formed in a spacing between said casing and said plurality of fuel cells so that said coolant flows along a surface of said casing, said coolant passage is connected to said guide grooves of each of said fuel cells in said casing,

a reactant gas supply passage and a reactant gas discharge passage extend through said fuel cells in a stacking direction of said fuel cells, and

a seal member provided on the at least one of said separators on the surface opposite to the surface facing said power generation units, where the seal member separates said reactant gas supply passage and said reactant gas discharge passage from said coolant passage.

13. (Currently Amended) A fuel cell stack according to claim 12, wherein the seal member extends along an entire width of the at least one of said separators on the surface opposite to the surface facing said power generation units, the seal member includes a bent portion that extends along a side surface of the at least one of said separators, the bent portion is interposed between said casing and said side surface of the at least one of said separators ~~three surfaces of the at least one of said separators, wherein two of the three surfaces are parallel to one another.~~

14. (Canceled)